3-7-2013

LEARNING OBJECTS TO HELP AGRICULTURAL EDUCATION STUDENTS IN THE HIGH SCHOOL CLASSROOM

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B.S., Agricultural Systems, Southern Illinois University Carbondale, December 2010

A Research Paper
Submitted in Partial Fulfillment of the Requirements for the
Master of Science

Department of Plant, Soil, and Agricultural Systems
In the Graduate School
Southern Illinois University Carbondale
May, 2013

RESEARCH PAPER APPROVAL

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Approved by:

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March 7, 2013

DEDICATION

I dedicate this research to all of my current and future agriculture education students. It is my hope that this research will help everyone to have a better understanding of the importance of agriculture.

ACKNOWLEDGEMENTS

Without the help and guidance from several individuals this project would not have been possible. Many thanks goes to my advisor's, Dr. Seb Pense and Dr. Dexter Wakefield, who helped me in finding a wonderful research project as well as compiling this document. And finally, thanks to my husband, parents, family and friends who stood beside me during this process and always provided kind words of advice, support, and encouragement.

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CHAPTER 1

INTRODUCTION

Background of the Study

High school students can be a great joy to work with. While it is an exciting time to work with high school individuals, they are each diverse in their own ways. In today's schools, many special need students are included into the regular education classrooms. While some think this is a wonderful thing others may disagree, but either way the students are in the classroom and the educator must teach everyone. In 2000, New Mexico agriculture teachers rated their individual ability to "teach learning disabled students" very low. It was also found that most special education students in these teachers' classrooms had learning disabilities or emotional/behavioral disorders (Dormody T. J., Seevers, Andreasen, & VanLeeuwen, 2006). Hillison (1980) has determined that agriculture educators are discouraged with themselves in their efforts to work with special education students (as cited by Elbert & Baggett, 2003). Educators must stay updated on technology and therefore should be in the mindset that "learning is lifelong" (Sorensen, Tarpley, & Warnick, 2010).

A new idea is being brought to educators; the creation of learning objects (L.O.). Five schools in Southern Illinois used L.O.'s created in Illinois. After testing the learning objects it was found that there was a positive change in the student's knowledge, both specific learning disabled (SLD) students and non SLD learners (Pense, Calvin, Watson, & Wakefield, 2012).

Theoretical/Conceptual Framework

The framework for this study was based upon Pense, Calvin, Watson and Wakefield's study in 2012.Within this study they focused on all students being included in the classroom, individuals engagement, assistive technology, curriculum redesign and the evaluation process (Pense, Calvin, Watson, & Wakefield, 2012).

According to Bloom et al. (1999) diversity is in a classroom when SLD students are working with traditional students (as cited by Pense, Calvin, Watson and Wakefield, 2012). When all students are in the classroom together it is defined as inclusion. In addition to inclusion, students will succeed in the classroom if they are engaged. Students should be active and motivated in the classroom; meaning they are interested and participating in the lesson.

In addition to all students being involved in the classroom and engaged, students may need additional support. Assistive technology can be a tool for students that allow for additional support as Hasselbring and Bauch stated (2006) and was cited by Pense, Calvin, Watson and Wakefield (2012).

As all students are in the classroom and engaged with the support of assistive technology educators may need to have curriculum updated. A learning object has recently become a very friendly tool to assist in lessons. Learning objects are very helpful to students as they are "textual, conceptual and practical" (Schlais & Ploetz, 2005). University of Minnesota's College of Veterinary Medicine defines learning objects as "an instructional module of limited didactic scope that is designed to be re-used by different instructors in different instructional contexts" (University of Minnesota College of Veterinary, 2006). A learning object is helpful to individuals of all ages because it has a voice recording where it can be heard, viewed conceptually with visual illustrations and is self-paced (Schlais & Ploetz, 2005).

After a learning object is created they must be evaluated. When evaluating an LO, it is essential to ensure there are no technology glitches imbedded into the tool. As an evaluator is looking at a newly created learning object, he/she may want to confirm that the learning object is helping the student to understand while it has visual images and provides motivation (Pense, Calvin, Watson, & Wakefield, 2012). Once evaluated, it is hoped that the creator of the learning object will share the content with other educators (Schlais & Ploetz, 2005).

Instructional Methods for SLD Students in Agricultural Education

There are many special need students enrolled in the regular education classrooms. Teachers are looking for ideas to assist the SLD students while still having time to prepare lesson plans, grade papers and complete the other tasks. There is a need for agriculture teachers to collaborate to find what ideas they have and then share the products they have made to assist with the students.

In developing this research, an article written by Pense, Calvin, Watson, and Wakefield titled "Incorporating Learning Object in a Curriculum Redesign to Meet Needs of Students with Specific Learning Disabilities in Illinois Agricultural Education Programs" shows that there is a great need for educational tools to be made that will help/assist educators with teaching SLD students in the agricultural education classroom (Pense, Calvin, Watson, & Wakefield, 2012).

Specific learning disabled students are not just in high schools, they are in all grade levels and in all areas of the world. Dormody, Seevers, Andreasen and VanLeeuwen (2006) stated that 19% of the agriculture education students had an individualized education plan in New Mexico high schools, as cited by Easterly and Myers (2011). Pense (2009) also states a large number of students in Illinois classroom with special needs are 23%, as cited by Easterly and Myers (2011).

The University of Minnesota's College of Veterinary Medicine has even noticed that students need additional support in education. The university has developed a few neurobiology learning objects to help their veterinary students understand specific lessons. Theses learning objects can be found by viewing http://vanat.cvm.umn.edu/learnObj (University of Minnesota College of Veterinary, 2006).

Hinders (1995) suggested that universities have a very large role to play when educating the future educators. He believed that the universities must adequately prepare the educators to teach special need students in the regular education classroom as cited by Kessell, Wingenback, and Lawver (2009). Wonacott (2001) stated that it is more common for special needs individuals to enroll in Career and Technical education (ie. Agriculture) courses because it will help prepare the individual for a career as cited by Easterly and Myers (2011).

Instructors must plan classroom lesson plans based on all students. Educators have found that using technology to work with all aspects of students learning levels can make educating more efficiently and effective. Technology can help the students learn but at the same will help them prepare for a career. Many careers use technology therefore students will have an understanding for technology. While technology is helpful it must be used as supplemental and not the remote way of teaching. Previous research shows that all students, including learning disabled can have greater success with integrating technology into instruction (King-Sears & Evmenova, 2007)

Statement of the Problem

Currently there is a lack of agriculture learning objects that are available to agriculture education teachers. The problem addressed in this study was to create more LO's for the agricultural education classroom. Once created, they were evaluated before adding them to the repository where other instructors will have access to utilize.

Purpose Statement

The purpose of this research project was to gain an understanding for learning objects, how they have been created and then to actually create four learning objects. The learning objects that were created will be put into a repository in order to give all agriculture education teachers access to them.

Research Questions

This study will be conducted by the following research questions:

a. What is the need to have learning objects available in the classroom?
b. How are learning objects created to utilize in the classroom?
c. What is the procedure to create usable learning objects in the agricultural education classroom?
d. What is the evaluation process of learning objects in the classroom?

Significance of the Problem

There is a diverse group of students in an agriculture education classroom. It has been noted that if curriculum is not designed to help learning disabled students it is possible to lose 25% of the future workforce in the agriculture industry (Pense, Watson, & Wakefield, 2010). In a recent career related study, it was found that there was a great need for students to learn more about careers in the fields of food, agriculture, and natural resources (Bajema, Miller, & Williams, 2002). Therefore, there was already a low interest in agriculturally related jobs, indicating a need to meet the needs of each individual in the agriculture education classroom.

While it is easy to say that teachers must adapt to all students and help everyone learn, in real life situations it is very hard for an individual educator to adapt and relate to each student. In a 2003 study, Elbert and Baggett came to the conclusion that teachers need to have opportunities to attend educational training that will allow them to learn various options in teaching all types of students. When a teacher works with special need students the teacher must stay up to date with technology, have the ability to create individualized instruction, as well as understanding the motivation needed to encourage students to achieve their best (Elbert & Baggett, 2003). Using computers and multimedia in teaching is a greatly needed topic for teacher in-service (Sorensen, Tarpley, & Warnick, 2010).

It is important for an educator to take time out of the daily routine and learn new knowledge. It is also recommended a teacher take time to get to know each student. It is very common for an educator to work with all types of students; therefore, there is a need for those working with students to understand all individuals (Kessell, Wingenback, & Lawver, 2009).

Limitations

In creating learning objects, there were a few limitations that could relate to the quality of the final product. The first limitation that could affect the quality of the created learning objects was the time constraints. In addition, learning objects could most likely be created much faster and more up to date if the technology available was more current.

Definition of Terms

This study may contain some words that are unfamiliar to the reader. The following is a list to provide operational definitions for some unfamiliar terms:

- Learning disabilities (LD) - A disorder in the psychological process involved with language. May harm the ability to listen, think, speak, read, write, or spell (Hasselbring & Bausch, 2005).
- Specific Learning Disability (SLD) - An individual that may have language abnormalities, visuo-spatial abnormalities, defects of synthesis, mixed deficits and/or disability without dyslexia. The individual's learning disability can vary greatly in the severity of it (Cole & Kraft, 1964).
- Learning objects (LO) - Interactive tools that assist with learning of specific concepts by enhancing/guiding the cognitive processes of the individual (Kay & Knaack, 2009).
- Assistive technology (AT) - Items that assists in improving functional capabilities for a disabled individual (Hasselbring & Bausch, 2005).
- Individualized Educational Plan (IEP) – Service plan created for an individual to meet the needs they have (Pretti-Frontczak & Bricker, 2000).

- Learning Object Repository – A learning management system, that allows educators to share other learning objects with each other (Pense, Calvin, Watson, & Wakefield, 2012).

CHAPTER 2

REVIEW OF LITERATURE

Overview

This study was to research the procedure for creating learning objects as well was their usability in the classroom. A review of literature was completed to address the following topics: (a) the need to have learning objects available in the classroom, (b) how learning objects are created to use in the classroom, (c) the procedure to create usable learning objects in the agricultural education classroom, and (d) the evaluation process of learning objects in the classroom.

Methods

In this study, descriptive research was used; including a literature review, construction of the learning instruments (LO's), validation of a panel of experts. To complete the research, various sources were utilized while many scholarly journals were accessed. For the most part, materials for research were gathered by utilizing the Morris Library of Southern Illinois University, Carbondale. With normal investigative measures, some information gathered was unconnected in answering the specific research. The information that was determined to be unrelated was set aside for reference at a later time. The gathered data that provided answers for the research were saved electronically and referred to as needed.

Learning Objects

A learning object can be thought of as a "digital educational resource" (Friesen, 2004). A learning object is extremely different than most resources for a student and the instructor. When a student is using a learning object, the actual resource is interactive. The student can take as long as they need to with a section and then move on at their own pace. A student can also go back in the lesson to re-learn a topic they did not understand. The learning objects are housed in a central location, online at http://teachag.siu.edu. All learning objects are at instructor's finger tips, meaning that they are available to anyone and free to download. Learning objects are not in a locked format therefore when a teacher downloads he/she can alter, dissect or use the entire learning object.

The need for learning objects in the Ag Ed classroom

Approximately ten percent of students receive special education services in the school. Of the students who receive special education services, approximately forty four percent of them are generally found in a normal classroom for at least eighty percent of the day (Hasselbring & Bausch, 2005). Specifically in Illinois, Pense (2009) found that 23 percent of the students in agriculture classrooms had specific learning disabilities.

Literacy can be a great challenge for LD students to overcome. It has been found that as many as eight out of ten LD students have a problem with reading. Hasselbring and Bausch (2005) have found that technology can help these students overcome their reading struggles. Technology can help students gather information, practice, and then show their knowledge gained (King-Sears & Evmenova, 2007).

While we can use assistive technology to help a special needs student, the same piece of technology can also be used as instructional technology. Instructional technology can be defined as something that the student prefers to learn with while it is not necessary for them to gain the knowledge/skill (King-Sears & Evmenova, 2007). Assistive technology can help special needs students that are being brought into an inclusive environment. The students can use technology to help them understand the lessons since they will use a self-paced guide (Pense, Watson, & Wakefield, 2010).

The creation of learning objects

In Pense's (2009) study, he found that Illinois agriculture teachers stated they were in "short supply" of resources to assist in teaching specific learning disabled students. There is a need to create learning objects. Before creating learning objects there are a few items that must be thought about initially; such as topic needed and reading level of students.

Whether a student is a traditional learner or a learner with a disability, verbal descriptions sometimes do not do justice. When graphics and text are visualized it can be simpler for all individuals to grasp (Krauss & Ally, 2005). When creating a learning object, it may take more work in the beginning to add graphics but will be worth it when they are being utilized.

Within the creation process of designing learning objects it will take time and dedication. Teaching and creating lessons takes time, thought, and effort (Krauss & Ally, 2005). When developing a learning object in the classroom, educators must be willing to adapt the object. When designing, one should be reminded that students should be able to skip levels if the content is already known (King-Sears & Evmenova, 2007).

It has been found that to inspire virtual learning for enjoyment the resource should be attractive, interactive, simple to utilize, and have hyperlinks that can assist in furthering education (Lin & Gregor, 2006). This study focused on learning for enjoyment, as students will be much more likely to learn and have the desire to learn if they can enjoy it.

It will take time for educators to create the actual learning objects and it is also important that teachers stay informed of new advances in technology (King-Sears & Evmenova, 2007). Teachers do not want to get "stuck in a rut" and continue to use the same things over and over. Educators must keep updated on technology and increase their lessons to go with the changes in technology. As educators are staying updated and learning, they must keep in mind that the learning objects should match the knowledge and skill level the students are currently at (King-Sears & Evmenova, 2007).

The evaluation process of learning objects in the classroom

Learning objects are new and exciting, which can offer great profits but at the same time could be used incorrectly. It is the teacher's responsibility to make sure the learning objects are being taught and used correctly to increase learning and knowledge (Nurmi & Jaakkola, 2006). It has been found that individuals learn best when contextual methods are utilized (Theriot & Kotrlik, 2009) therefore make sure the learning object is related to the topic being taught.

When evaluating learning objects one should reflect on the tool. Richard Clark (1983) has argued that, "learning is caused by the instructional methods embedded in the media presentation", as cited by Joy II & Garcia (2000). Educators want to make sure the methods they are using are allowing the students to grow. Students that have utilized the learning object should be encouraged to provide feedback. Students should then know that their feedback is important

and that educators are listening to their ideas in order to improve the learning objects (Assessing Student Achievement, 2006). When Krauss and Ally researched and presented learning objects they collected student feedback. With the feedback compiled, they received comments that included positives regarding the use of animation due to the visual type of learning style and the format of the learning objects. The format of learning objects is normally very basic and step by step which allows individuals to work at their own speed. Another comment they received after presenting the learning object is that they would like to have seen more sound or animation (Krauss & Ally, 2005).

While conducting research, Schlais and Ploetz's (2005) goal of learning objects was to improve traditional face to face instruction. Face to face instruction should be part of the learning object evaluation, as well. Educators want to reflect on the instruction that was provided during the learning object. You do not want to simply have the students learn from only the learning object and never hear the teacher lead instruction or activities.

When evaluating the learning objects it is helpful to make sure that lessons are engaging the students. Tomlinson (2001) found that having students actively involved and challenged, when appropriate, is what creates an environment in which students will learn (as cited by Easterly III & Myers, (2011). Kay and Knaack (2009) feel that a high level of engagement is necessary when utilizing learning objects. The learning objects will be successful if the students are engaged and motivated. To ensure engagement the learning object should maintain an individual's attention. The technology used must be enjoyable, but also positive and allow the student to be active in the lesson (Lin & Gregor, 2006).

CHAPTER 3

RESEARCH PROCEDURE, RESULTS AND CONCLUSIONS

Research procedure

To begin creating learning objects as part of this project, four lessons were selected from the Illinois Core Curriculum for Agriculture in October 2012 (Illinois State Board of Education, 2004). After selecting four lessons, I downloaded and studied the developed power point presentations. The lessons that were selected were chosen because it was felt that many instructors could benefit from the particular topics. I did not want to choose topics to create learning objects that may not actually be taught in many classrooms. After looking at the current presentations, it was then my goal to adapt them to become learning objects.

To create the learning objects, I began by editing the text on the presentation in Mid October 2012. I edited it to make the words simple in terms. In editing the created presentation, I found several words that may be hard for SLD students to understand. To allow the students to have a better understanding, I found it appropriate to change the words. If there was a specific term that needed to be in the L.O. then I chose to keep the word but created a hyperlink that led the student to the definition of the word.

I also added slides to allow less text to be on each slide. Some of the pre- created slides, had lots of information and more or less looked scary to the student. To keep the fear down, and for the students to "want" to learn, I divided the text and created more slides. My students have shared that they find a slide with only a couple sentences much more user-friendly.

Photos were added to the learning objects in November 2012. The pre-created slides were not very bright in color. To enhance the learning, photos were added which related to the content of the L.O. Photos allowed the students to visually understand the content.

To really convert these presentations into learning objects, once all text was on the slides then voice recordings were added. This allowed the student to have the slide read to them by clicking a button. The voice recordings were added through Microsoft Power Point. Once clicking on the start recording, I would then read the slide to record my voice. I did talk slower than normal just to ensure the students have plenty of time to listen to the recording while following along with the words that are displayed on the learning object. Voice recordings were completed in mid-November 2012.

Specific terms that a student may not have known were hyperlinked to another slide. If the students did not know what a specific word meant they could click on the word to learn the definition. "Next slide" and "previous slide" arrows were also put onto each slide to allow the student to navigate throughout the lesson. The arrows will help remind the students that they could go back to the previous page to help them remember something they did not understand at first. The forward arrow reminded students that there is more information to look at to help their understanding increase.

A group of three co-working teachers volunteered to take some time to review and suggest changes to all four learning objects. The teachers were given the learning objects in late December 2012 to begin proofing. Two of the volunteers were high school special education teachers, while the other individual was a high school English teacher. The teachers returned thoughts and comments to me by mid-January 2013. Many of their thoughts were very positive, stating that the learning objects were a great new idea and they felt it would be very helpful to all

students. A couple grammatical errors were pointed out and I corrected them. It was also suggested to re- record a specific slide of voice recording due to a mistake that was made during the recording. All learning objects were corrected and re-reviewed by myself by the end of January 2013.

Once completed, it was my hope that these learning objects would meet the specifications of the agriculture education department at Southern Illinois University Carbondale and would be shared with other agriculture education educators on the university's website (http://teachag.siu.edu).

Results

Many results were exhibited by the production of four learning objects. Learning objects were created (Appendices A-D) on the following topics: Understanding Flower Anatomy, Practicing Horticulture Safety, Opportunities in the FFA, and Explaining a Soil Profile.

Agricultural education instructors now have an additional four learning objects that they have access to via http://teachag.siu.edu. Not only do the teachers have access to another resource but it is a resource that will meet the needs of their SLD learners.

Conclusions and Recommendation

While creating the learning objects has been very rewarding as well as educational, I do feel that there are some recommendations to make. The learning objects created could be known, in the future, for error due to the knowledge and skill level the students are at. The LO may be too advanced or too low of a level for the student. Each teacher should access it and make the decision as to whether it would be useful for students or not. It would be my recommendation that more learning objects be created and then shared in a repository. Sharing the LO's allows other teachers to utilize them and is very helpful in assisting others to save time. As more learning objects are created, more research can be completed with statistics given by using LO's in the classroom more often. In conclusion, it is my hope that I have not only helped my students by creating these learning objects, but have also helped many other agricultural education teachers with resources.

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APPENDICES

Appendix A: Learning Object 1- Understanding Flower Anatomy

UNDERSTANDING
FLOWER ANATOMY

Click the green arrow below to begin...

Instruction / Help
Green arrow to go forward
Blue arrow to go back
Red Home icon to go to the beginning of the slide show

Now click on the green arrow at the bottom to continue.

Words you will learn about:

- Anther
- Filament
- Ovary
- Petals
- Pistil
- Pollen
- Sepals
- Stamen
- Stigma
- Style

What Are the Parts of A Flower?

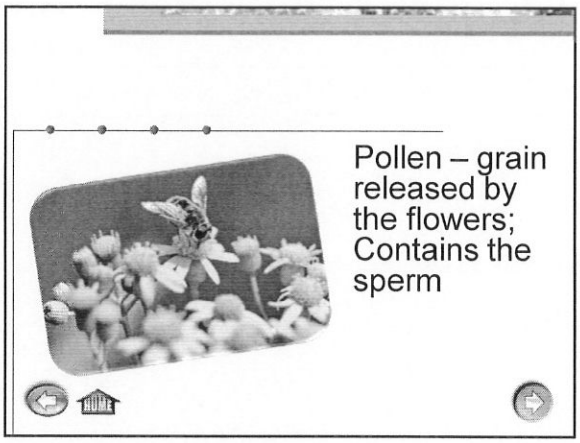
- Flowers are the most obvious part of a plant
- They are made of many important parts

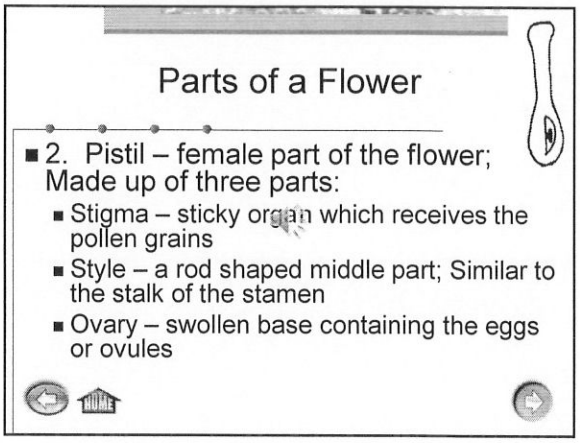
Courtesy of McGraw Hill Publishers

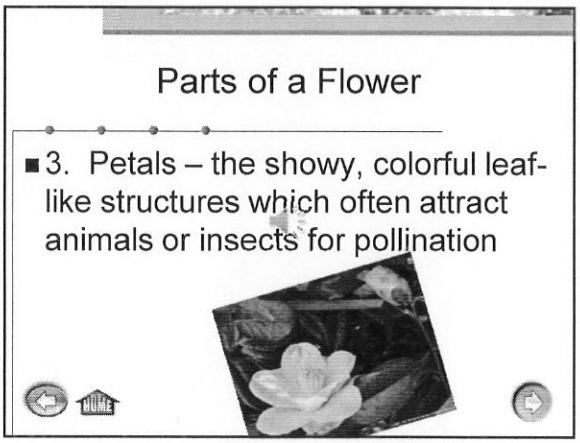
Most flowers contain male and female parts.

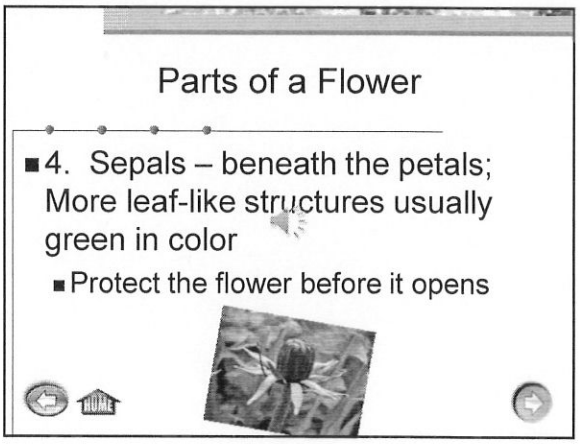
Parts of a Flower

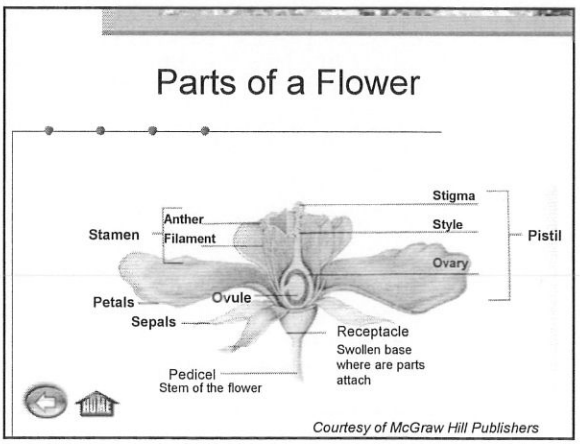
- 1. Stamen – the male part of a flower; Made up of two parts:
  - Filament – stalk of a stamen; Holds up the anther
  - Anther – sack-like portion containing the pollen


Pollen – grain released by the flowers; Contains the sperm

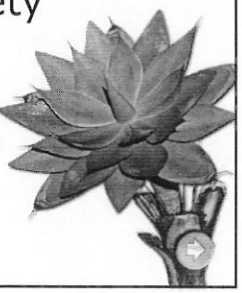

Parts of a Flower
2. Pistil – female part of the flower; Made up of three parts:
Stigma – sticky organ which receives the pollen grains
Style – a rod shaped middle part; Similar to the stalk of the stamen
Ovary – swollen base containing the eggs or ovules


Parts of a Flower
3. Petals – the showy, colorful leaf-like structures which often attract animals or insects for pollination


Parts of a Flower
4. Sepals – beneath the petals; More leaf-like structures usually green in color
Protect the flower before it opens


Parts of a Flower
Stigma
Anther
Style
Stamen
Filament
Pistil
Ovary
Petals
Ovule
Sepals
Receptacle
Swollen base where are parts attach
Pedicel
Stem of the flower
Courtesy of McGraw Hill Publishers

Practicing Horticulture Safety



Click the green arrow below to begin...

Instruction / Help

Green arrow to go forward

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Now click on the green arrow at the bottom to continue.

What do each of these pictures have in common?

What is Horticulture Safety?

- If you said keeping safe, then you were right!
- If you said keeping safe with horticulture; then you were even more right.

Go to the next slide to learn more about horticulture safety. Click on the green arrow...

Why is safety important in horticulture?

- Safety is important everywhere
  - in horticulture,
  - In other areas of agriculture,
  - in work,
  - and in life in general.

To be ***safe*** means to be free of harm.

Practicing ***safety*** in horticulture involves preventing injury and loss.

Safety is everyone's responsibility.

Appendix B: Learning Object 2- Practicing Horticulture Safety

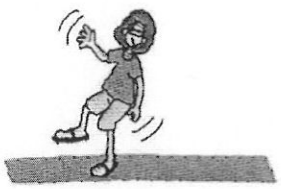
Why is safety important in horticulture?

- Knowing about safety can help prevent accidents.
- We never know when an accident might happen- it is a risk we take.

- ***Accidents*** are actions that occur unintentionally.
- The chance that an accident might occur is ***risk***.

Why is safety important in horticulture?

- ***Hazards*** are situations in which dangers are present.

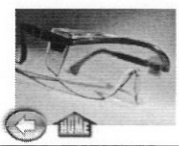


Why is safety important in horticulture?

- In horticulture safety, we must be safe with:
  - pest control,
  - machinery and tools,
  - tractors and large equipment.

What is personal protective equipment?

- *We can wear items to help us prevent an injury.*
- *They call these things Personal protective equipment.*



When should we wear these items?

Safety Glasses with sideshields and brow guard

Goggles

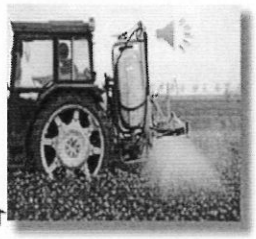
Face Shield

Eye Protection

- Wear eye protection when:
  - working with chemicals,
  - working in the shop,
  - bright light could cause injury.

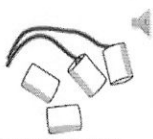
Eye Protection

- Eye protection is also needed when working with Chemicals



Hearing Protection

- We want to always be able to hear!
- Wear protection to protect your hearing.

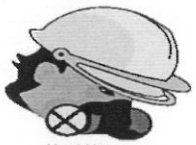


Corded and Uncorded Ear Plugs

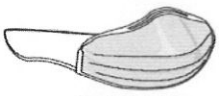
Ear (hearing) Muffs

Breathing Protection

- Wear a mask or respirator if you will be breathing something unusual.
- Vapors and fumes can hurt your lungs.



Hard Hat and Respirator



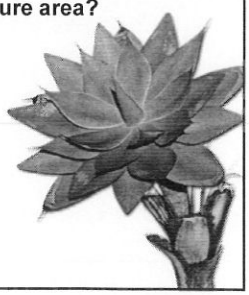
Particle Mask

Skin Protection

- Protect your skin and body.
- You may want to wear:
  - Gloves
  - Aprons
  - Hard hats
  - Long sleeves
  - Long pants
  - Boots

Review/Summary

- **What may you need to wear to be safe when working in the horticulture area?**



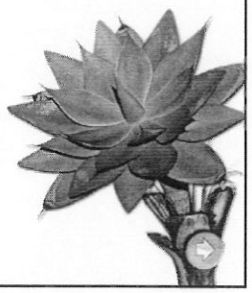
Appendix B: Learning Object 2- Practicing Horticulture Safety

To be safe you may need to wear:

- Mask
- Long Sleeves/Pants
- Boots
- Gloves
- Aprons
- Hard hats
- Ear plugs/muffs
- Goggles

Horticulture Science
Explaining a Soil Profile

Click the green arrow below to begin...



Instruction / Help

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Now click on the green arrow at the bottom to continue.

What is a soil profile?

- A ***soil profile*** is a vertical cross-section of the soil.
- This is basically a very deep hole.

What is a soil profile?

- When looking at the soil, you should be able to see the different layers (or types) of soil.
- Each layer of soil may be different from the rest in a physical or chemical way.
- The layers of soil will most likely be different in color.

What is a soil profile?

- The differences in each layer is caused by something, it could be from
  1. Parent material
  2. Slope
  3. Native vegetation
  4. Weathering (time)
  5. Climate

- A soil profile is usually studied to a depth of three to five feet.

1. Parent material- underlying material such as bedrock.
2. Slope- angle that the land is on
3. Native vegetation- plants growing on the land.
4. Weathering- water and wind
5. Climate- temperature

Appendix C: Learning Object 3- Explaining a Soil Profile

How do soils within a soil profile change over time?

- Soils change over time in response to their environment.
- The environment is influenced by soil-forming factors.

How do soils within a soil profile change over time?

- The causes of these changes can be classified into four processes.

1. Materials such as fallen leaves, wind-blown dust, or chemicals from air pollution that may be added to the soil are ***additions***.

How do soils within a soil profile change over time?

2. Materials may be lost from the soil which is called ***losses***.

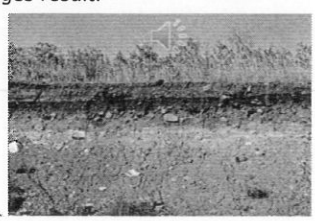
3. Materials may be moved within the soil.
   - This can occur with deeper leaching into the soil or upward movement caused by evaporating water, resulting in ***translocations***.

How do soils within a soil profile change over time?

4. Materials may be altered in the soil, resulting in ***transformations***.

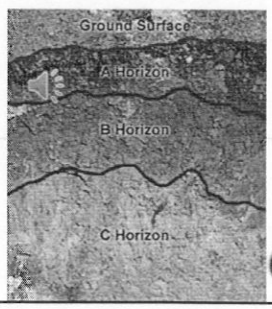
How do soils within a soil profile change over time?

- Each of these processes occurs differently at various depths.
  - As a soil ages, horizontal layers develop and changes result.



What are the major horizons of a soil profile and how do they differ?

- There are three primary soil horizons called master horizons.
- They are A, B, and C.



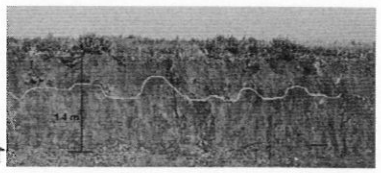
Appendix C: Learning Object 3- Explaining a Soil Profile

What are the major horizons of a soil profile and how do they differ?

- "A" horizon is often referred to as ***topsoil*** and is the surface layer where organic matter accumulates.
  - The A horizon provides the best environment for the growth of plant roots, microorganisms, and other life.

What are the major horizons of a soil profile and how do they differ?

- "B" horizon is referred to as the ***subsoil***.
  - The B horizon will have less organic matter and more clay than the A horizon.
  - This is where most of the plant roots grow.

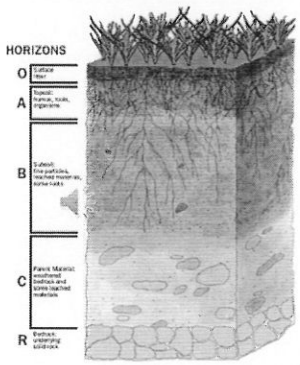


What are the major horizons of a soil profile and how do they differ?

- "C" horizon is referred to as the ***substratum***.
  - It lacks the properties of the A and B horizons since it is influenced less by the soil forming processes.

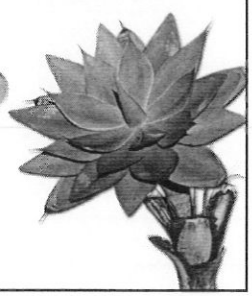
What are the major horizons of a soil profile and how do they differ?

Look at the photo to see!



Review/Summary

•What is a soil profile?



What is a soil profile?

- A ***soil profile*** is a vertical cross-section of the soil

Appendix D: Learning Object 4- Opportunities in the FFA

Opportunities in FFA

Click the green arrow below to begin...

Instruction / Help

Green arrow to go forward

Blue arrow to go back

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Now click on the green arrow at the bottom to continue.

- Leadership is one of the major areas stressed in FFA.
  - ***Leadership*** is the ability to influence other people to meet individual or group goals.

A ***leader*** is a person who helps other people reach their goals.

A good leader has:

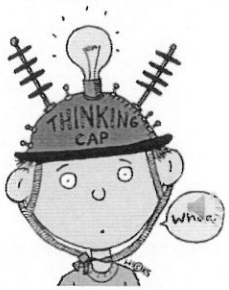
- Personal skills
- "How to" skills
- "Thinking" skills
- "People" skills

Click on each skill to learn more!

Personal skills—traits that make it easier for other people to follow a leader, such as being hardworking, responsible, and honest

Appendix D: Learning Object 4- Opportunities in the FFA

"How to" skills—traits that help a leader share responsibilities, such as organizing meetings, speaking to groups, and writing messages



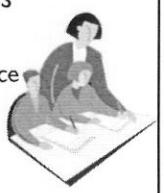
"Thinking" skills—traits that enable a leader to think and assess problems

- "People" skills—traits that help a leader relate well with other people, such as being trustworthy, respecting others, and having a positive attitude

Personal growth is also important in FFA.

Personal growth allows you to develop skills in order to have a better life.

FFA promotes career success



Supervised Agricultural Experience (SAE) is an example of a career-related activity.

A ***Career Development Event (CDE)*** provides opportunities to practice technical skills learned in the classroom that will be used later in career settings.

FFA provides a number of offices for leadership development.These offices include:

1. President—presides over meetings
2. Vice-President—presides in absence of the president
3. Secretary—takes minutes of meetings
4. Treasurer—in charge of the financial accounts
5. Sentinel—keeps order in meetings
6. Reporter—reports news to media
7. Historian—keeps FFA scrapbook
8. Parliamentarian—rules on parliamentary conduct during meetings
9. Chaplain—presents invocations at functions

REVIEW

1. How does the FFA organization develop the skills and characteristics for future career success?

Question:
How does the FFA organization develop the skills and characteristics for future career success?

Answer:
FFA can help with career success by members attending Career Development Events and keeping a Supervised Agriculture Experience.

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Learning Objects to help agricultural education students in the high school classroom

Major Professor: Seburn L. Pense, Ph.D.